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MAGNETISM AND GRAVITATION

An Essay on Celestial Mechanics

by

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MAGNETISM AND GRAVITATION

An Essay on Celestial Mechanics

Since the time of Isaac Newton the theory of gravitation as applied generally to celestial mechanics has provided the basic concepts for the laws that govern the science of astronomy in spite of many difficulties. It holds this position, even today, after many years of investigations from which it appears that Newton's law of gravity cannot be derived either from the motions of the planets or from the Cavendish experiment.¹

The Cavendish experiment, which serves as an experimental proof of the force of gravity, shows the attraction between two lead spheres. Stars, however, are not made of lead; they have none of the properties of lead, and furthermore, they possess magnetic fields. In experimenting with iron-core bodies one sees, in the vicinity of an infinitesimally small magnetic source, an effect fully comparable to the gravitational force acting between two large masses.

Space travel today still accepts this fact. Therefore, whatever the aims of this essay, attention is called to the underlying possibilities. There have been a number of observers in the field of celestial mechanics who have investigated the mass of published data and their correlation with magnetic phenomena. In every case there is a sound foundation for the connection that is still to be observed, thus leaving the way open for an experimental approach. In the same way the early findings of Johaan Kepler and Rene Descartes were later verified.

The results of the above mentioned investigations should show:

1. That the magnetic potential of the earth is about 28 billion times larger than its gravitational potential. /2
2. That the sun, planets and their moons rotate on the electromotor principle of the "left-hand rule" through their magnetic fields.
3. That planets and comets have been set in motion by the rotating magnetic field of the sun; moons are similarly propelled by the magnetic fields of their planets.
4. The nodes of the planetary orbits are fixed by the magnetic force in direct relation to their axes of rotation.

¹ B. Thuring, "Methodology and History of the General Law of Gravitation," Munich 1956.

5. The perihelia of the planets are determined by the magnetic force in direct relation to their rotational axes.

6. The laws of satellite motion determined by Cassini are derived from magnetic effects.

7. The wandering of the earth's axis of rotation is due to magnetic disturbances in the sun.

8. The variations in the rotation of the earth are due partially to solar disturbance and partially to the regular magnetic fields of the sun and the moon.

9. The daily and yearly tides in the seas, air and land masses are produced by the magnetic fields of the sun and moon.

10. Shooting stars are the result of counterrepulsion by magnetic fields.

1. THE MAGNETIC POTENTIAL OF THE EARTH

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Whenever a gravitational force exists between two masses of appreciable size there is a magnetic field of 0.006674 gamma. This value is considerably below the measurable exactness of today, but it can be determined theoretically from a study of the relationship between masses and shows a magnetic equivalent to the gravitational constant. When the interior of the earth is considered as a permanent magnet and the crust with its boundary some 34 km beneath the continents and some 10 km beneath the oceans, as nonmagnetic, the relationship between these two divisions of mass is 99.7% to 0.3%. Multiplying this ratio of mass with the intensities, one finds that the magnetic potential of the earth is 28 billion times larger than the gravitational potential. This does not take into account the fact that the earth's crust itself is composed of magnetic, ferromagnetic, paramagnetic and diamagnetic materials. Were these to be taken accurately into account, the magnetic potential of the entire mass would be determined precisely, while the gravitational potential, of the sort that would have influence on a magnetic body, would be practically equal to zero.

Newton's precise approach was based on the assumption that all material bodies, without exception, are subject to the unique property of gravity according to the inverse square law. By this simplification, no differences between magnetic, nonmagnetic, electric or other radiative energies or attracting bodies are possible. Newton argues that all opposing forces, whatever their nature, must fall toward the center of the earth and concludes on the apparent universality of the force of gravity. This force is applicable to all bodies and must be the same for magnetism because it is easy to show that there is no stronger magnet than the earth.

Contrary to Newton's concepts, which are still generally accepted, /4 there is a fundamental trend to realize that observations made on the surface of the earth cannot be extrapolated to outer space. It is obvious that all large magnets must attract small magnets - likewise because their axes are parallel or constitute opposite poles - as long as a certain critical distance between them is assumed. Once outside this critical distance small magnets can be pulled away from larger ones. This is true for other substances whether they be paramagnetic or diamagnetic.

Water, for example, has the property of being diamagnetic and will therefore resist a magnet. Whenever a water laden layer comes next to a magnetic field it will be drawn nevertheless to the surface of the magnet and will be held there; it too, will exert a certain force of attraction.

Certainly today no physicist will be taken in by the idea that on the basis of these observations a universal law for the attraction of all bodies at any distance, known as the gravitational theory, is valid - as long as the observations on which the theory stands are performed directly on the surface or in the vicinity of an iron magnet.

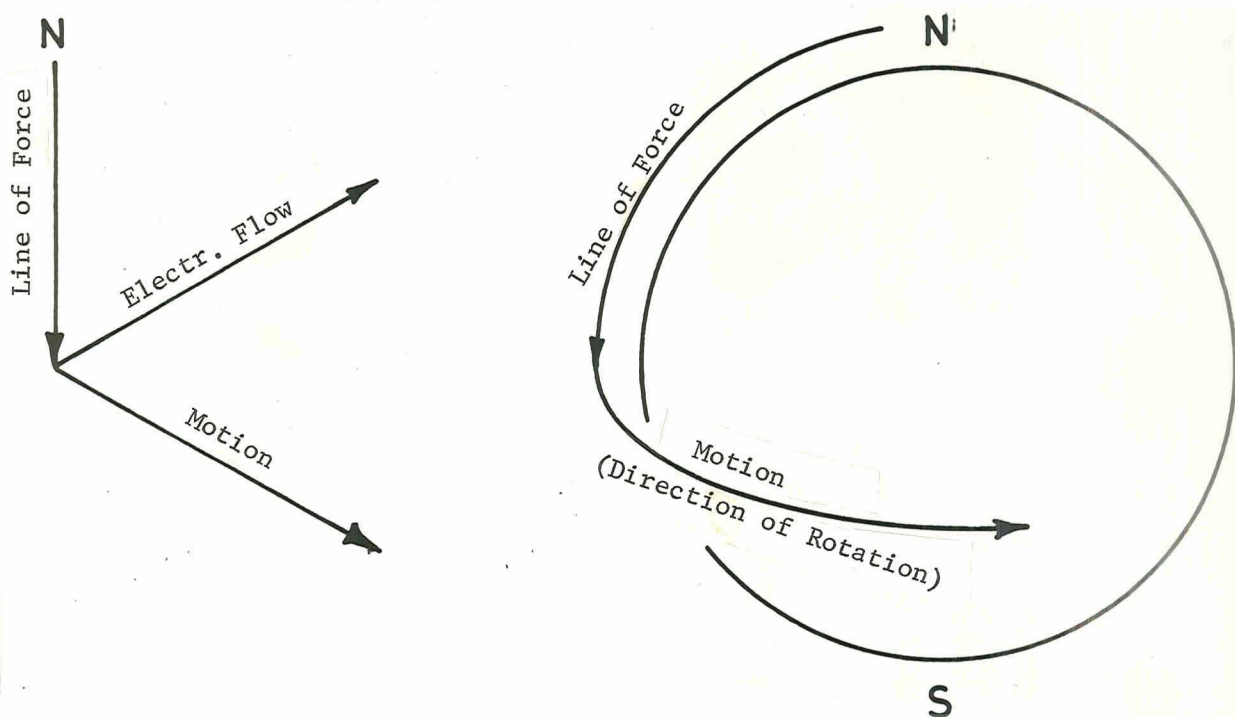


Figure 1. The Electromotive Principle in the Mechanics of the Cosmos

2. THE ELECTROMOTIVE PRINCIPLE IN THE MECHANICS OF THE COSMOS

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From the science of electricity it is known that magnetized materials receive a rotational impulse in the direction of their magnetic axes.²

Figure 1.

In the same manner an electrical conductor in a magnetic field moves at right angles to the direction of current flow and at right angles to the direction of the magnetic lines of force. When this so called "Left Hand Rule" is applied to celestial bodies, it sets them rotating like electric motors. Here we must bear in mind that the poles of laboratory magnets behave differently from cosmical magnets.

The gravitational theory is unable to offer any explanation for rotation. To find a basis for the fact it must postulate a rotating protonebula³ from which by simple extrapolation, as conjectured, the rotation is communicated to celestial bodies.⁴

² G. Mie, "Textbook on Electricity and Magnetism."

³ R. Robert, "The Formation of Stars by Condensation of Diffuse Matter,"
Göttingen 1960.

⁴ J. Stumpf, "Astronomie," Frankfurt 1957.

3. THE MOTION OF A PLANET IN THE MAGNETIC FIELD OF THE SUN

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Experiment 1, Figure 2.

To demonstrate the propulsion of planets, let us take a large spherical magnet made from any kind of hardened and magnetized tool steel. On this spherical magnet we now place a small, very powerful, oxide magnet like those widely used in various industrial applications. We now have a sphere with a general field interrupted by a smaller but stronger field of force, very much like that of the sun, whose general field is broken up by the magnetic effects of sunspots.

The spherical magnet (M_s), which may be prepared by placing it in the field of a coil, is now immersed in a pan of water. Let the spherical magnet (M_s) be enclosed in a casing at about the water level and a light direct current be sent through a coil around the outside of the pan. Let us fill the pan to the top of M_s with water and allow a second smaller magnet to float around it with its magnetic axis parallel to the general axis of M_s . In this way M_p remains between the casing and the edge of the pan so that it is free of both.

Now if M_s is rotated, we soon note that M_p begins to move and tries to follow the rotation of M_s which the smaller magnet induces in it. Now whatever the polarity of the smaller magnet is, this will soon be indicated by the orbit of M_p showing just how it corresponds to the variations in the direction of its magnetic axis and its motion about it.

It is possible that M_p will always move in direct relation to M_s so that its orbital path will have a direct relation to the rotation of M_s with a ratio of 1 to 1. It is also possible to move M_s faster than M_p can follow it. Then every rotation of M_s gives a direct impulse of M_p , thus driving it forward in its orbit.

The sun, however, does not rotate like a solid sphere with uniform angular velocity but has a differential rotation. It rotates at its equator in 24.5 days and at its poles in 34.5 days. Taking the arithmetic mean of 29.5 days for the period of rotation as a reference - which corresponds to about 27 daily turns in the earth's magnetic field - and comparing this with the periods of the planets we obtain the following:

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Mercury	:	3	Deviation	:	- 0.31%
Venus	:	$8 = 2^3$		:	- 5.12%
Earth	:	$12 = 3 \cdot 2^2$		:	+ 2.88%
Mars	:	$24 = 3^1 \cdot 2^3$		:	- 3.01%

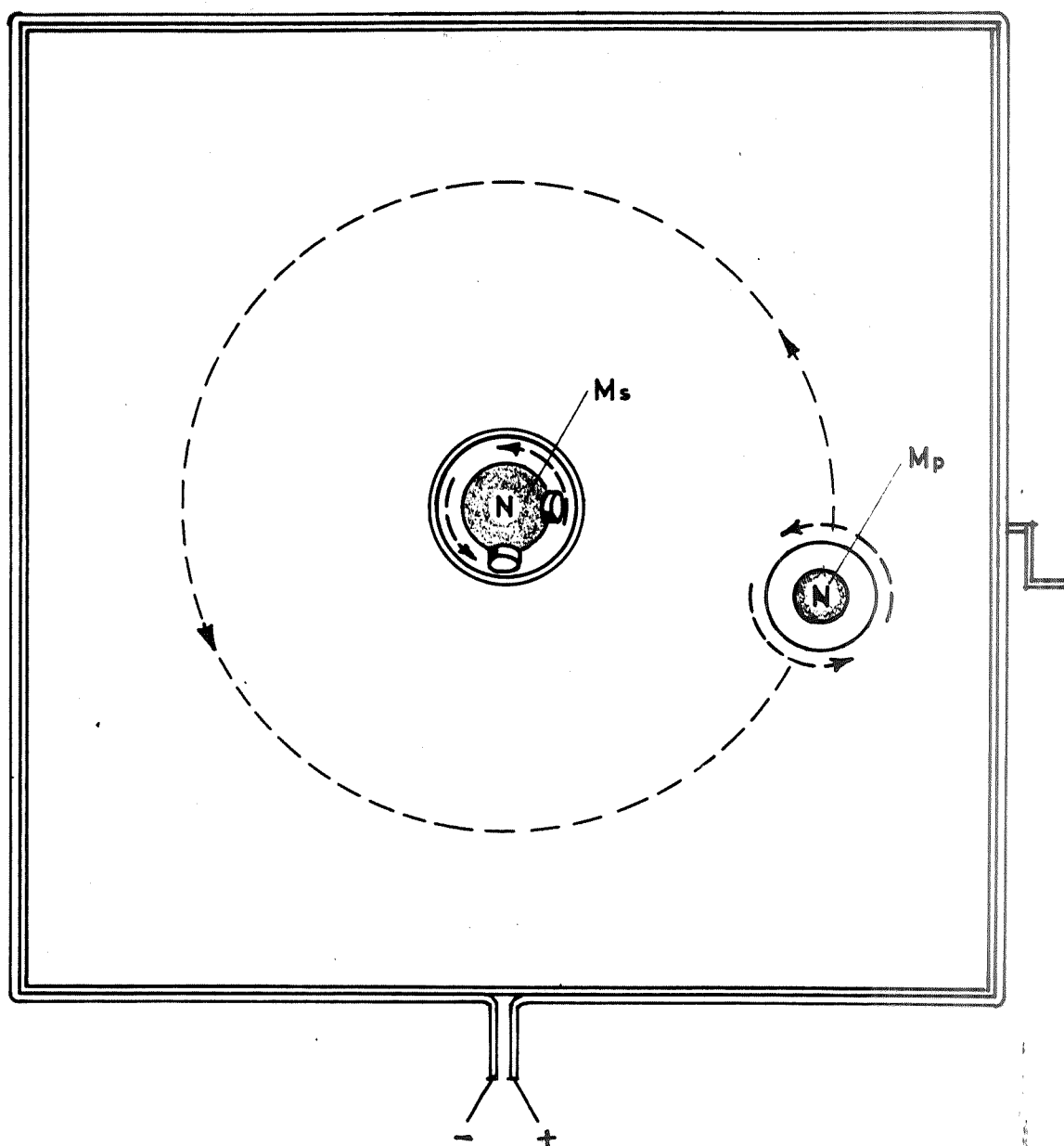
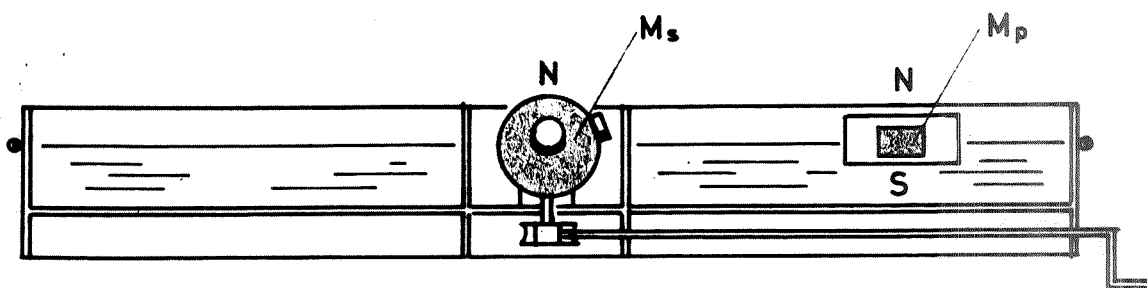


Figure 2. Magnetic Planetarium

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Jupiter	: 144 = $2^4 \cdot 3^2$	Deviation : + 1.88%
Saturn	: 360 = $5 \cdot 2^3 \cdot 3^2$	: + 1.31%
Uranus	: 1024 = 2^{10}	: + 1.25%
Neptune	: 2048 = 2^{11}	: - 0.40%
Pluto	: 3072 = $3 \cdot 2^{10}$	: + 0.09%

For the synodic period of the moon we find the unexpected agreement of a 1 : 1 correspondence with a deviation of 0.31%.

In the same way the periods of comets very often correspond to the rotation of the sun:

Enke	: 40 = $5 \cdot 2^3$	Deviation : + 1.58%
Temple II	: 64 = 2^6	: + 2.63%
Temple-Swift	: 70 = $2 \cdot 5 \cdot 7$	: + 0.46%
Pns-Winecke	: 75 = $3 \cdot 5^2$	: - 1.63%
Kopf	: 75 = $3 \cdot 5^2$	: - 2.14%
Temple I	: 81 = 3^4	: - 0.03%
Giacobini-Zinner	: 81 = 3^4	: + 0.64%
Biela	: 84 = $3 \cdot 7 \cdot 2^2$	: - 2.15%
Wolf II	: 84 = $3 \cdot 7 \cdot 2^2$	: + 0.97%
Faye	: 90 = $2 \cdot 5 \cdot 3^2$	: + 1.67%
Wipple-Fedtke	: 90 = $2 \cdot 5 \cdot 3^2$	: + 1.80%
Wolf I	: 100 = $2^2 \cdot 5^2$	: + 2.61%
Tuttle	: 162 = $2 \cdot 3^5$	: + 4.43%
Temple 1886	: 400 = $2^4 \cdot 5^2$	: - 1.27%
Westphal	: 750 = $2 \cdot 3 \cdot 5^3$	: + 0.22%
Pons-Brock	: 882 = $2 \cdot 3^2 \cdot 7^2$	: + 0.45%

Olbers : $900 = 2^2 \cdot 3^2 \cdot 5^2$ Deviation : - 0.05%
 Halley : $945 = 5 \cdot 7 \cdot 3^3$: - 0.86%

Through the dependence of the periodicities on the sun's rotation we have now come to an understanding of the marvelous law of Titius-Bode because this law is nothing more than a linear relation to the harmonic law of Kepler between period and semimajor axis.

According to the theory of magnetic force of satellites, it is evident from the example of comets and the moon, that their rotation is determined by the rotation of the central body.

Let us consider some statistics⁵ so that we can see how far some bodies may depart from this dependence on a central mass. Foremost among those with retrograde motion is the well-known Halley's comet with a period of 76 years. All comets with shorter periods than this have direct motion.

The planets, Jupiter and Saturn, have some satellites with retrograde orbits which are nevertheless at very great distances from their planets. For example, Jupiter's satellites XII, XI, VIII and IX are at 21, 22.5, 23.5 and 24 million kilometers and Saturn's satellite IX at 12.9 million kilometers. The nearer satellites always have direct motion in their orbits and they lie close to the equatorial plane of the planet. Only the more remote ones depart from this plane.

In the experiment just described, it was shown that a retrograde body must be slowed down and dragged. In the same way, retrograde comets and satellites are slowed down and dragged by the central body until their retrograde motion comes to a stop and changes to direct.

The gravitational theory offers no explanation for this impulse in a system of planets since it shows only an application of centripetal force. With respect to retrograde motion, there is need for a further hypothesis with which astronomers have struggled for 250 years without any success.

4. THE DETERMINATION OF THE POSITION OF ORBITAL NODES BY THE ROTATION OF PLANETS ON THEIR AXES

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Figure 3.

Suppose we give the floating magnet (M_p), as shown, an axis inclined to the force field of the fixed magnet (M_s). M_p will now move above the equatorial plane of (M_s). The greater the angle of inclination,

⁵ C.W. Allen, "Astrophysical Quantities," The Athlone Press, London 1955.

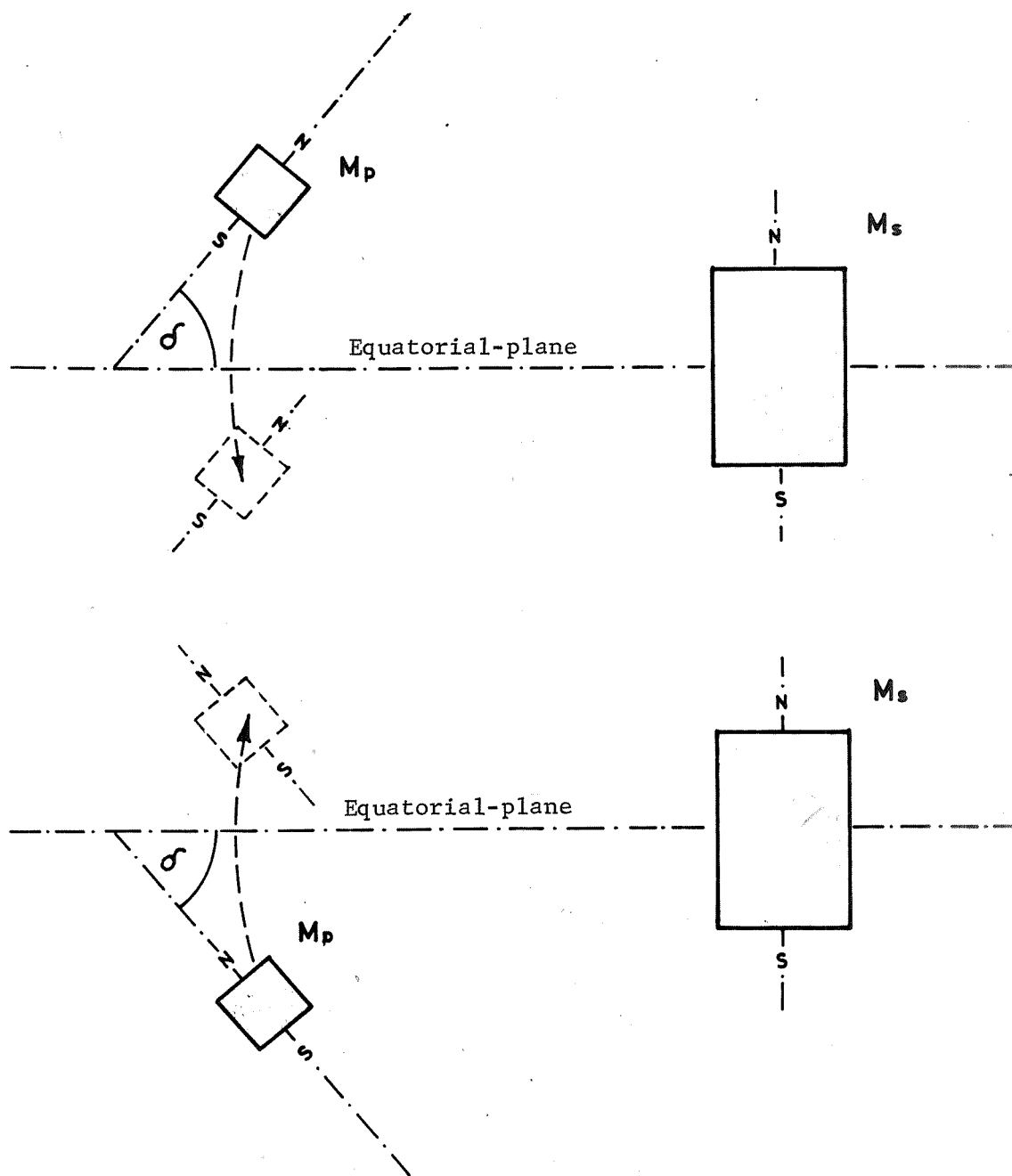


Figure 3. Motion of a Floating Magnet (M_p) Toward the Equatorial-Plane of a Fixed Magnet (M_s) by Inclining the Axis ($\delta = 90^\circ - i$).

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the greater this motion will be. It is apparent that M_p moves around the south pole of M_s when its north pole is pointed at the axis of M_s and vice versa when its south pole faces M_s .

Figure 4.

Thus the south poles of all of the planets move when their north poles face the sun and their north poles shift when their south poles point toward the sun. The shift regresses in the fall and advances in the spring. This assertion is easily proven by considering the orbital nodes in the ecliptic plane which the planets make with the solar equator. From a schematic of these elements, it is quite evident that for all planets, whose axes of rotation are known, the ascending nodes correspond to the autumnal points and the descending nodes to the vernal points at the following angles:

Figure 5.

Earth	: 75° 4'
Mars	: 22 30
Jupiter	: 77
Saturn	: 119 45
Neptune	: 39 06

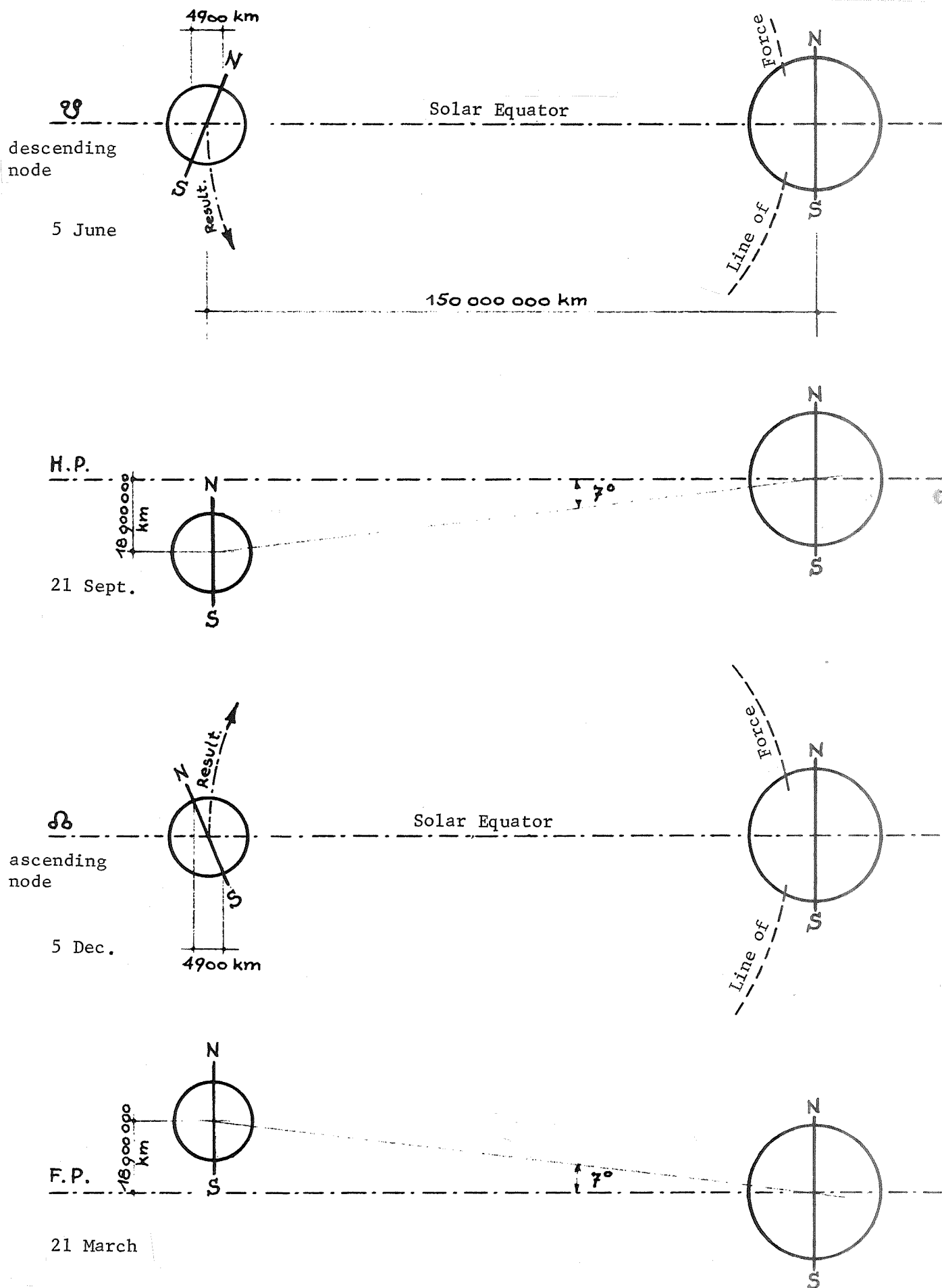
5. THE POSITIONS OF PERIHELION WITH RESPECT TO THE ROTATIONAL AXES OF THE PLANETS

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Figure 6.

If the magnetic flux is flowing between the north and south magnetic poles, then the magnets which set the planets in rotation in this stream must have different strengths. Because of the obliquity of their axes, they pull themselves away from the summer point toward the winter point against the stream of the sun's magnetic field; they pull away from the winter point toward the summer point with the stream. It is now necessary to study the MAGNUS-Effect from the science of hydrodynamics which is effective at a distance from the sun. We may compare the position of the perihelion to the direction of the axis of rotation and then we shall actually find for the planets a typical relationship by which all the perihelia conform to the winter point at the following angular distances from it:

b) Magnetic influence due to different angles of inclination of the axes.



15.2.1957 Figure 4. Relationship Between the Magnetic Fields of the Earth and Sun

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Figure 7.

Earth	:	11° 44'
Mars	:	17 16
Jupiter	:	110 12
Saturn	:	55 26
Neptune	:	108 46

Hence it should be understood that by counterrotation planets are pulled toward the sun and by direct rotation they are repelled from it; this establishes the existence of the MAGNUS-Effect for cosmical magnets.

Figure 8.

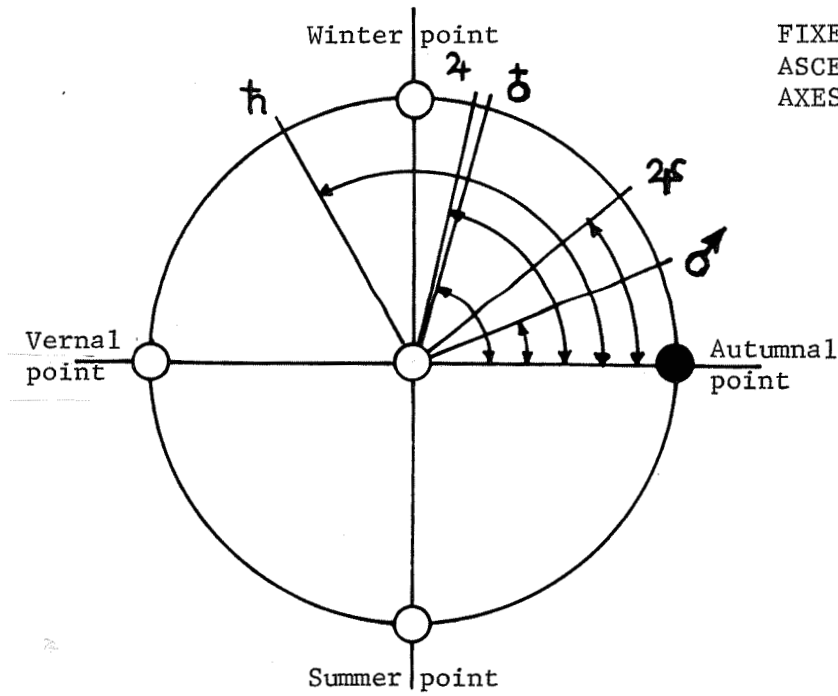
Plotting the angle between the nodes and perihelion for each planet against the angle of inclination to the axis of the sun, the resulting values yield a curve. With the help of this curve - which is valid only for inclinations up to 23° 15' - one can obtain approximate values for the planets whose axial inclination has not been observed but whose orbital elements are known. Thus the obliquity will be for:

Figure 9.

Mercury	17° 24'
Venus	21 18
Pluto	7 24

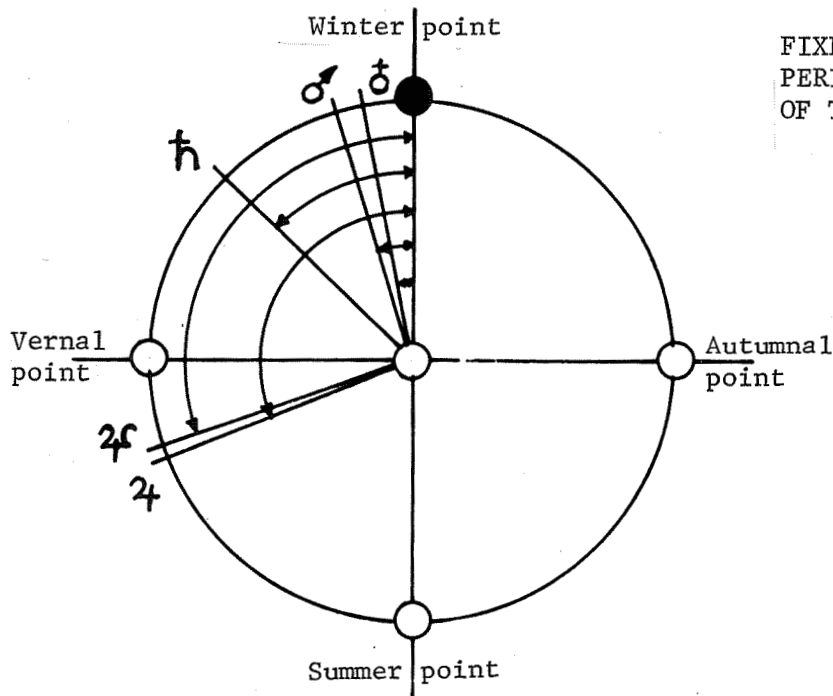
Therefore, in the theory of gravitation, no solution for the axial inclinations of the planets is offered with respect to periodic motions. Moreover, whether referred to the sun's equator or to the ecliptic, the orbital elements give no clue to these new relationships, even though in the 17th century the law that fitted them for the moon was found by Cassini.

/11



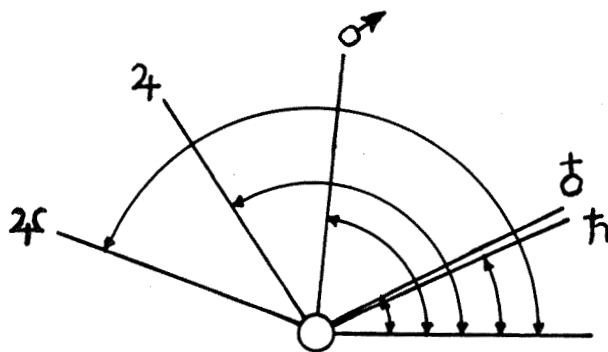
FIXED POSITIONS OF THE
ASCENDING NODES OF THE
AXES OF THE PLANETS

Figure 5



FIXED POSITIONS OF THE
PERIHELIA OF THE AXES
OF THE PLANETS

Figure 7



ANGLE BETWEEN THE
ASCENDING NODE AND
PERIHELION FOR:

EARTH	: ♂
MARS	: ♂
JUPITER	: ♂
SATURN	: ♂
NEPTUNE	: ♂

Figure 8

REFERENCE PLANE SOLAR EQUATOR

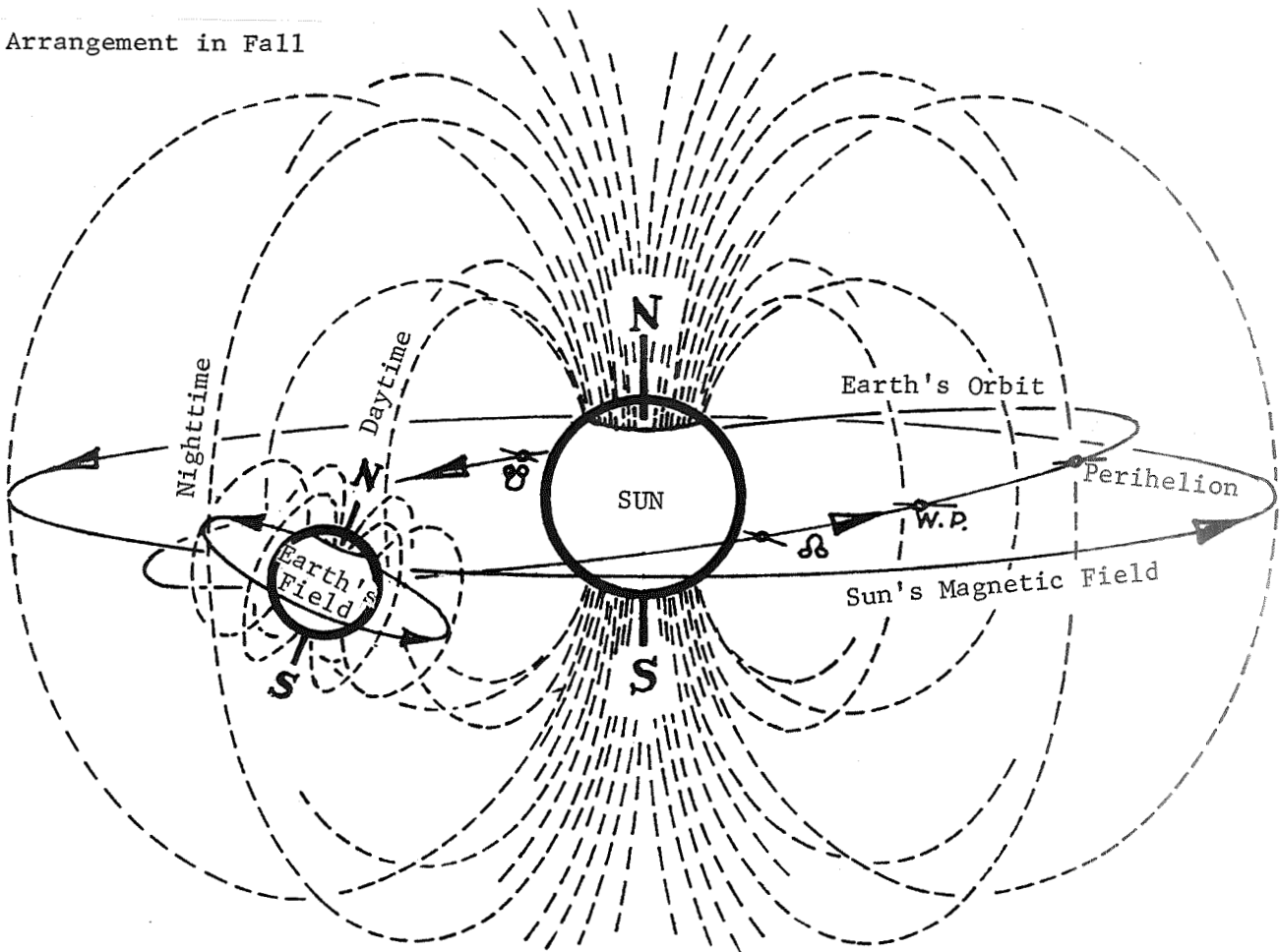
Translator's Note: ♂ = Venus
⊕ = Earth
in usual abbreviations

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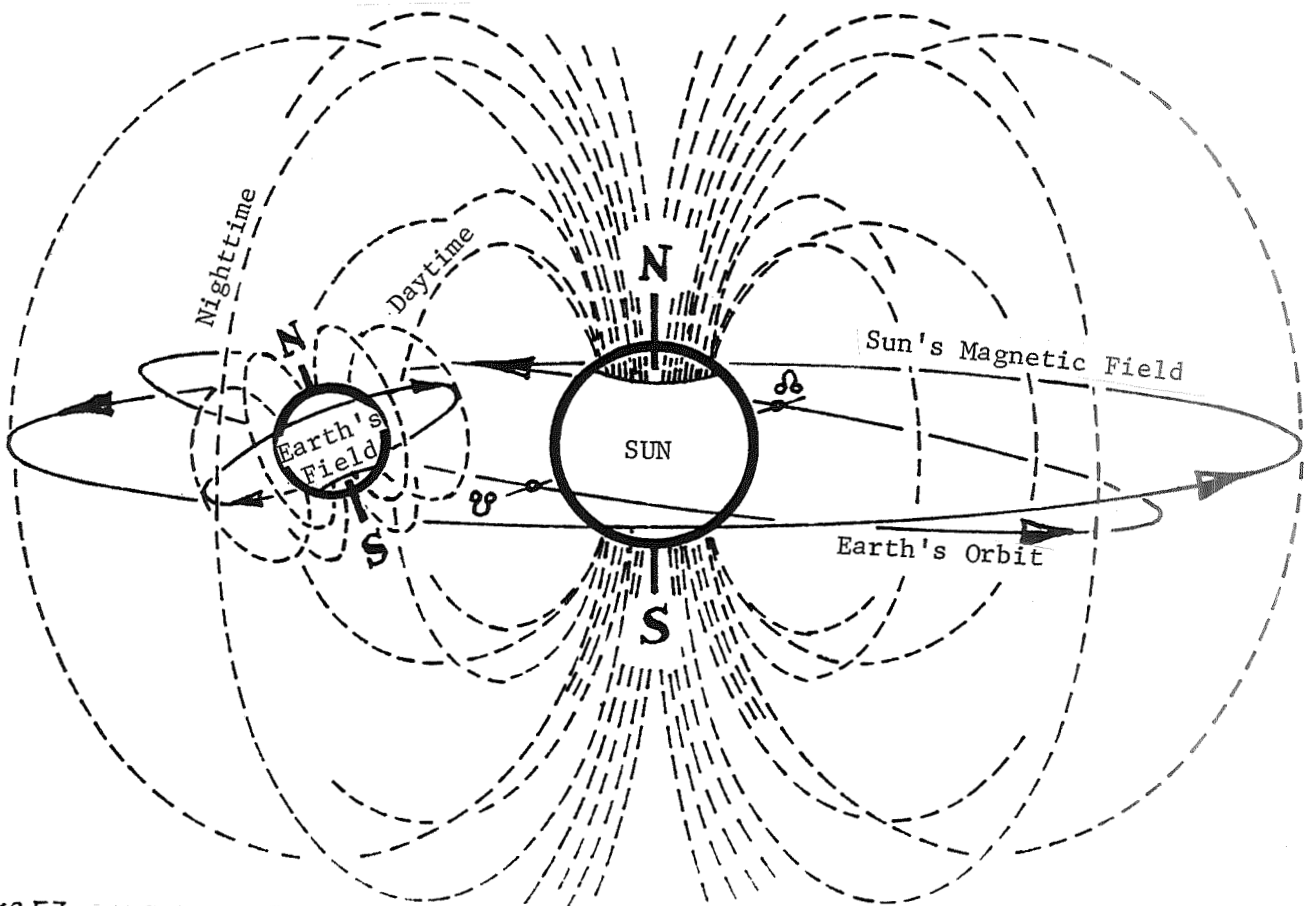
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a) Different intersections of the curves of the lines of magnetic force.

Arrangement in Fall

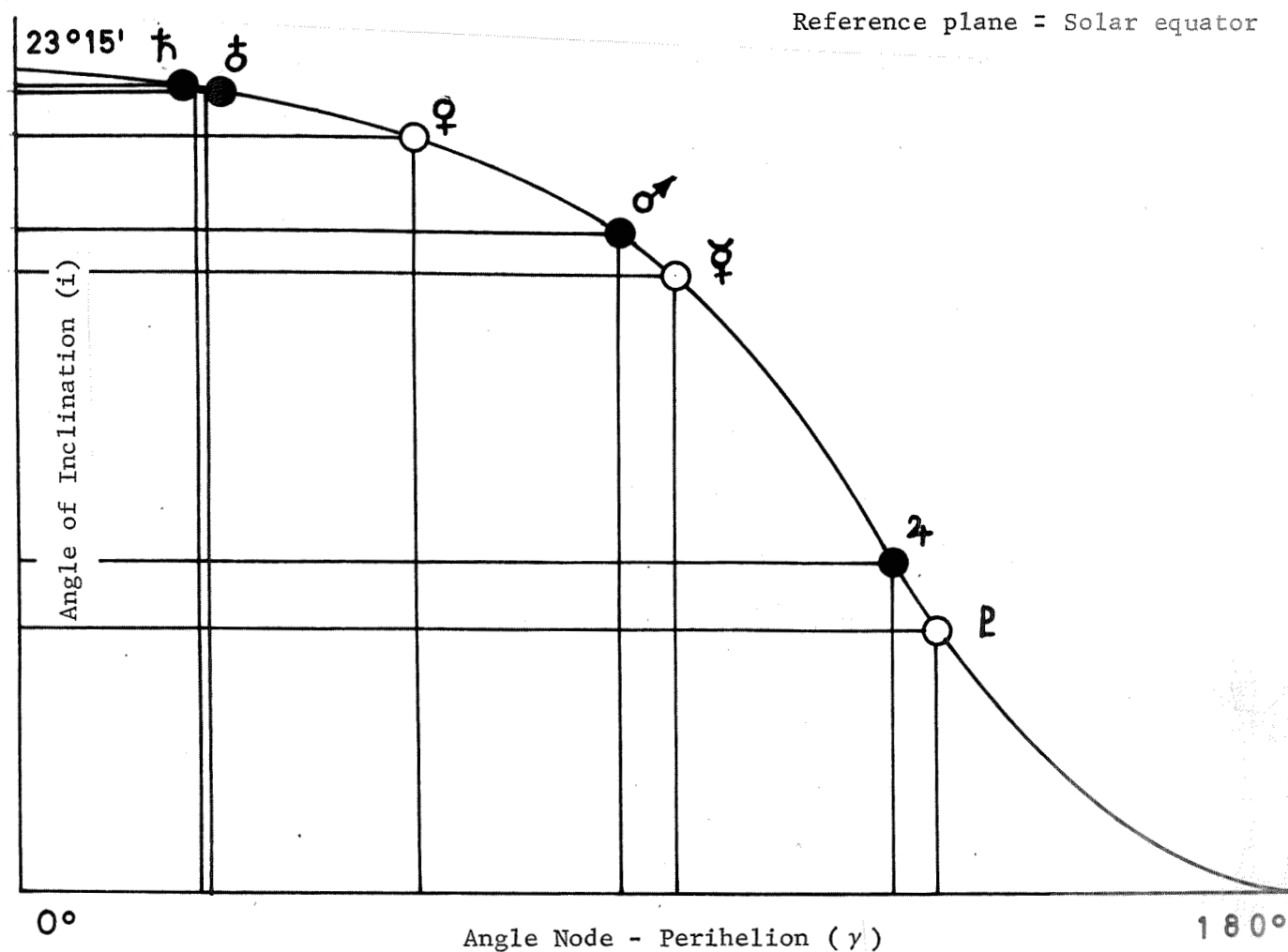


Arrangement in Spring



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Figure 6. Relationship Between the Magnetic Fields of the Earth and the Sun



APPROXIMATE VALUES:

Mercury	$i = 17^\circ 24'$	$\gamma = 92^\circ 42'$
Venus	21 18	56 06
Earth	22 38	26 40
Mars	18 36	84 46
Jupiter	9 12	123 12
Saturn	22 42	25 41
Pluto	7 24	129 33

Figure 9. The Angle of Inclination (i) of the Axes of the Planets with Respect to the Sun's Axis Determine the Factors for the Angle Between the Ascending Nodes and Perihelia (γ)

6. THE BASIS OF CASSINI'S LAW

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In 1693 G.D. Cassini established three laws on the motion of the moon:

1. The moon rotates about a fixed axis in a period exactly equal to that of its orbit about the earth.
2. The inclination of the moon's equator to the ecliptic is invariable.
3. The ascending node of the moon's equator and the ecliptic always coincide with the descending node of the moon's orbit and the ecliptic.

These laws are valid for the mean orbital distance with a small periodic change.

Cassini's first law serves as a proof for rotation caused by a slight magnetic field as was shown in sections III(3) and VIII (8).

The second law states that the moon's axis must be directed away from the earth and must follow all variations in the earth's orbit. This corresponds to a magnetic influence.

The third law determines the relationship of the position of the orbital nodes for the moon to its axis of rotation, in the same way that the magnetic function under IV controls the planets.

In the gravitational theory, Cassini's first law is equivalent to a hypothetical tidal wave which the earth sends out against the moon and which is stopped by it. This theory must set the moon, according to the third law, swinging ever wider like a pendulum. It can be discerned from very precise investigations that this tidal wave can cause the aforementioned oscillation.⁶

The introduction of Cassini's first law gets rid of assumptions which do not exist and which lead to conclusions that likewise do not exist.

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The same happens with the introduction of his second and third laws. These were founded on the principle that the moon was influenced by the equatorial bulge of the earth and thus was perturbed in orbit. This argument, if strengthened as the observations of recent earth

⁶ F. Franz, "The Moon," Leipzig 1906.

satellites show, that the effective field of the earth's gravity is different than was assumed up till now, and that especially the equatorial bulge, has not the influence that was attributed to it. Granting this, the earth was said to be pear-shaped, whereby the southern half has a slightly larger bulge than the northern half simply because the earth's satellites show less perturbation by the northern hemisphere than by the southern.⁷

Let us decide, whether this pear-shape is real or not, that there apparently is a very slight but significant tidal wave toward the moon, in which case, by reason of theoretical gravitation, the moon loses its controlling hold and no longer remains in space.

After all we must not wonder any more since it is established that the moon shows a decided departure from the law of gravity. It seems to be very obvious that, in the vicinity of the massive earth, such irregularities should be much better observed than with other heavenly bodies.⁸

It has been considered important to improve the determination of the moon's orbit so that finally an endless number of equations results. Among others, Delaunay, in 1867, produced a set of analytical equations that filled 138, 155, and 173 pages. While these mathematical pyramids achieve nothing more than the basis from observations for "improved terms" which, however, have no theoretical foundation.⁹

Commentary:

Johaan Kepler gives in Chapter XXI of his book, "Astronomia Nova," the admirable statement, "While a false hypothesis has some truth and such cases are widespread:

It happens in investigating various explanations that sometimes an error leads to one bordering so closely on the true that the error in the hypothesis cannot be detected."

7. THE VARIATIONS OF THE EARTH'S AXIS

/14

The pole of rotation of the earth does not extend through the crust of the earth directly, but wanders in an irregular spiral curve

⁷ U. Becker, "World Atlas," Freiberg 1962.

⁸ E. Stockl, "Kepler Memorial," Regensburg 1930.

⁹ Spencer Jones, "The Rotation of the Earth," Handbuch der Physik, Göttingen 1956.

whose departure amounts to about 10 meters. The period is about 14 months. The motion has been recently disturbed over an interval of 5 to 10 years and now, following the impulse, the disturbance can cease within a year.¹⁰

The experiment described under IV (Rotation of the Planets) gives a hint as to the nature of the disturbance which affects the earth.

Obviously it is the powerful magnetic eruptions from the sun which shake the earth on its foundations. The force reaches directly the inner core of the earth and causes frictional vibrations between the core and the solid crust where both are separated only by a thin layer of magma. It is now clear that this influence on the magma transmits an induced effect to the crust of the earth. Thus we have an explanation to the statistical correlation between the force causing the variation in the pole and earth tremors.

A direct relationship between sunspots and earthquakes was shown as early as 1904 by E. Oddone who, at that time, could find no connection between the cause and effect. By reason of the erroneous physical principles, the future search for objective criteria proved fruitless.¹¹

The root of these failures lies in the method of investigation. One does not treat sunspots as sunspots and earthquakes as earthquakes, but, on the contrary, tries to observe the magnetic polarity of sunspots, the heliographic latitude and longitude from the central meridian, and likewise on the earth, the geographic latitude, whether the earthquake took place through push or pull or by shearing. That sunspots induce both push and pull forces is evident from the fact that, as the Japanese seismologists have found, some earth tremors are rapid and others are slow.

Nevertheless, the variations in the axis of the earth are not easily related to the general solar activity but every single effect of magnetic eruptions must be investigated since the pulses produce an acceleration, as well as a deceleration, which, in turn, is communicated to the earth's field.

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The gravitational theory, on the other hand, explains the wandering of the pole by the annual dependence of the mass-adjustment in the earth's crust, in which air and water currents take part. Mathematical proofs have already shown that such an effect has a very meager influence and it never can be observed.¹²

¹⁰ K. Jung, "Figure of the Earth," Handbuch der Physik, Göttingen 1956.

¹¹ V. Conrad, "The Recent Conclusions on Earthquakes," Handbuch der Geophysik, Berlin 1932.

¹² Spencer Jones, "The Rotation of the Earth," Handbuch der Physik, Göttingen 1956.

Beneath this true polar variation, the Japanese Kimura discovered an apparent variation which was noted at all observation sites as a vibration of the earth in the direction of its rotation and had a period of one year.¹³

The phenomenon was observed in the experiment under section IV. It appears in the case of all of the planets as a magnetic effect and, as early as 1842, was recognized by Le Verrier in the planet Mercury as a regular pulsation.

As far as the gravitational theory goes, the Kimura variation is totally inexplicable. As a consequence we have been constantly misled or left in the dark.

8. THE VARIATION IN THE EARTH'S ROTATION

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From measurements with the caesium-atomic clock at Teddington, three different kinds of variations in rotation have been found: the secular, the irregular and the periodic. The first, derived from a long series of data, is very small. The irregular variations take place over an interval of 5 to 10 years and cannot be predicted. The periodic ones show annual and semiannual intervals as well as some of 27.6 and 13.6 days.¹⁴

The irregular variations should be treated as under VI like the variations in the earth's axis by the magnetic influence of the sun. Here is where the experiment performed in IV provides an answer as well as direct observations of the gigantic solar flare on 23 Feb. 1956 and in July 1959 in which A. Danjon casually saw a suspicion of a change in the length of the day.¹⁵

The periodic variations are determined in part by experiment. A magnet floating (M_p) with its axis at right angles is placed in the force field of a powerful magnet (M_s) whose magnetic field is horizontal or greatly inclined. If M_s is set in rotation, M_p will follow it whether the rotation is to the right or to the left. Whatever the direction, M_p shows this in its rotation; that is, it turns always in the same

¹³ F. Schmeidler, "The Variation in the Earth's Axis," *Naturwissenschaftl. Rundschau* 6/1957.

¹⁴ L. Essen, "Variation in the Speed of Rotation of the Earth since June 1955," *Nature* Vol 181, 12.4, 1958, St Albans.

¹⁵ J. Bartels, "Geophysik," Frankfurt 1960.

direction as the central magnet. The apparently complicated phenomenon becomes clear when a system of space coordinates is set up for axes of M_p and M_s which fixes an equatorial plane for M_s . (Cf. Fig. 10)

Consider the basic rotational impulse in a quadrant of M_s corresponding to that in which the earth is situated in its revolution around the sun. Thus we see the semiannual sinusoidal variation by which the rotation of the earth must be accelerated and decelerated.

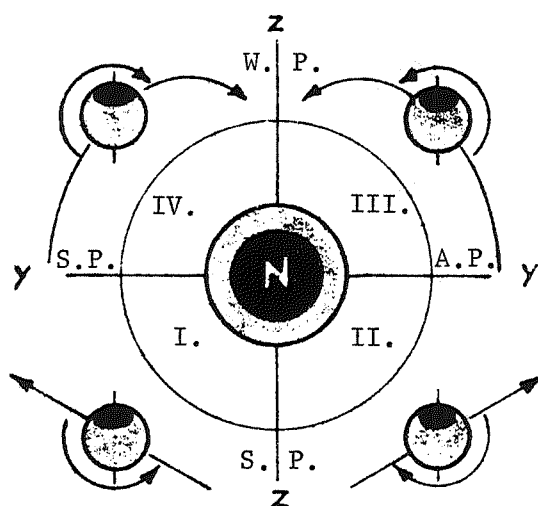
The semiannual period is superimposed on the annual in accordance with the Magnus Effect described in V, since the rotation must follow a steady force as well as an acceleration. From the addition of both curves, whose amplitudes are assumed free for time being, a second curve results which corresponds approximately to that indicated by the cesium atomic clock. (Cf. Fig. 11) /17

The short period intervals of 27.6 and 13.6 days are unquestionably connected with magnetic forces which arise from the revolution of the moon from perigee to perigee in 27.5546 days (the anomalistic month) and from ascending node to descending node in 13.6 days (one-half Draconistic month).

In the gravitational theory the same explanation of the variations in rotation has been put forth as that for the variation in the earth's axis: the daily variation in the moment of inertia, caused by snowfall, ocean and air currents, and rise and fall of the continents producing a variation in the earth's rotation.

Many facts contradict these assumptions. For example, the freezing and melting of the amount of water at the poles of the earth actually produces the shift, since at one pole where there is winter the water is solid, while at the other there is summer and the ice melts. Whence the phenomenon of shifting from one axis to the other, it should be evident to all that the moment of inertia must be shifted in no small way even if the mass in question is rather small. In this way de Sitter concludes that it is possible to have vertical fluctuations in the continents, with the result that when the level of the plateau in central Asia, including the Himalyan mountains, was lifted above sea level, the length of the day was altered by no more than one millisecond.¹⁶

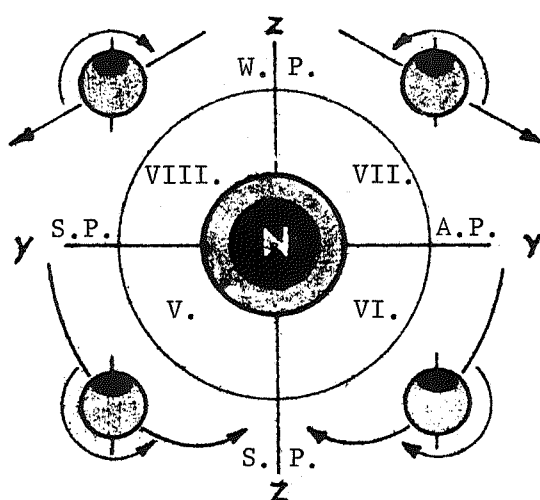
¹⁶ Spencer Jones, "The Rotation of the Earth," Handbuch der Physik, Göttingen 1956.



upper half of the solar equator

MOTION INFLUENCE

lower half of the solar equator



ISOMETRIC DIAGRAM

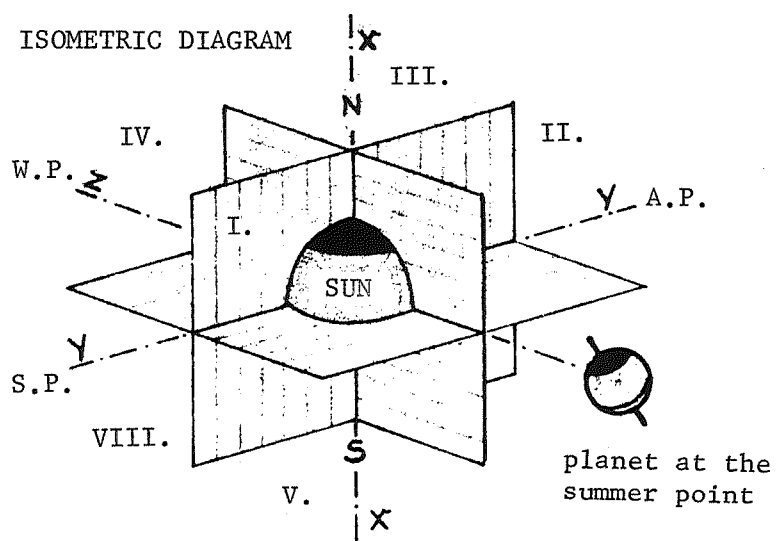


Figure 10. Secondary Magnetic Influence of the Sun on the Periods and Rotation of the Planets (Quadratic - Functions)

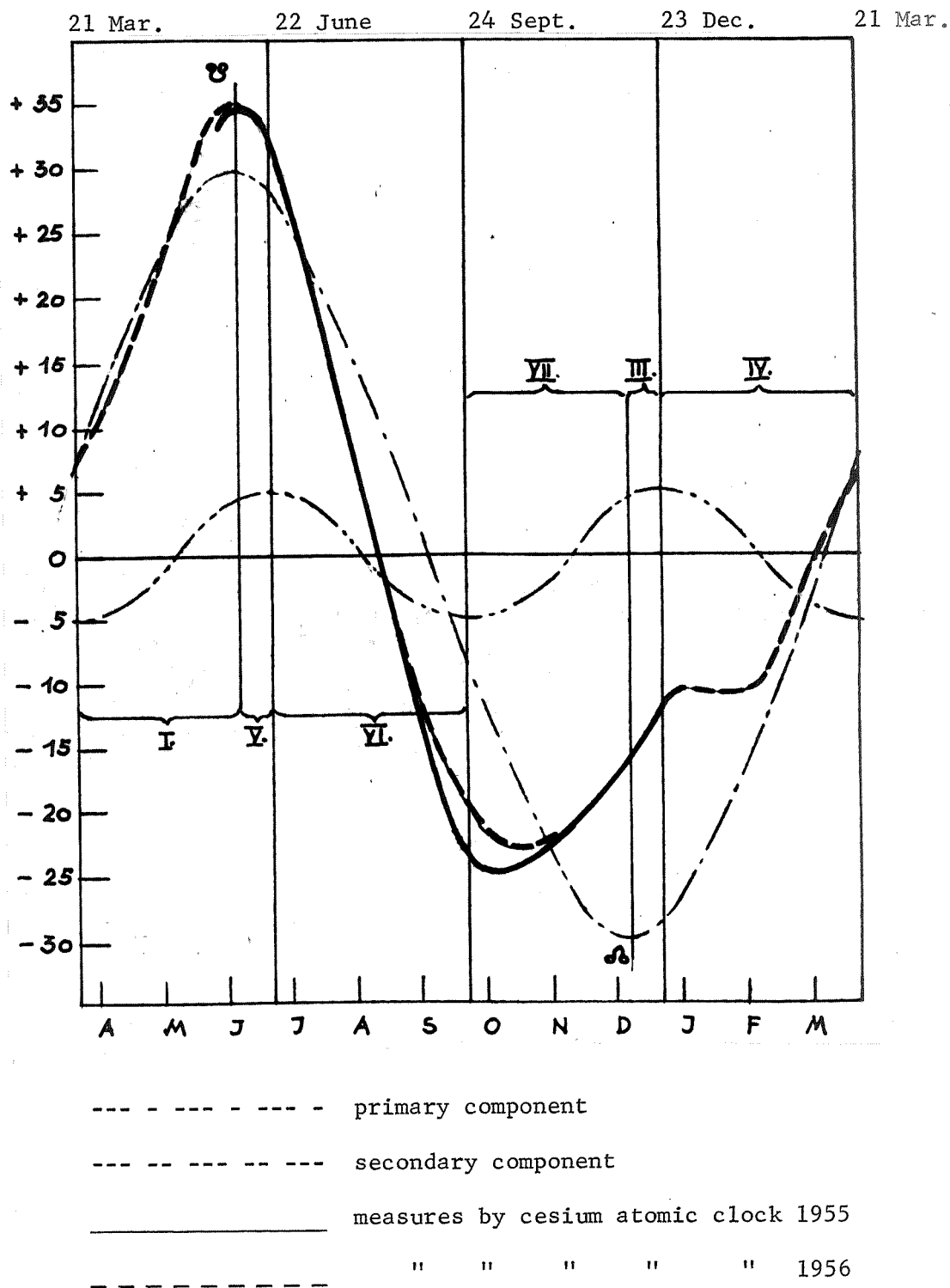


Figure 11. Magnetic Causes of Variations in the Inclination of the Earth's Rotation in 1/1000 sec.

9. THE DAILY TIDES

/18

The time of high water varies along the coasts of the oceans as the interval of the lunar tide has values between 0 and 12 hours, according to the time when the moon is on the meridian.

In the widest expanses of the Atlantic from the north and the south, a daily wave flows out of the polar seas which spreads out over the entire breadth of the ocean as far as the equator where it breaks against the coast of the Americas and separates at the coasts of Africa and Europe. As a result of the overlapping from direct and reflected waves, the variations which determine the establishment of a port are very complicated.

The factors are very much simpler in the wide expanse of the Pacific. Here, at the American (San Francisco), as well as the Asiatic (Philippines) side, it is definite that the high tide arrives 2 to 4 hours before the meridian passage of the moon so that it is evident that the moon is shoving the water of the Pacific ahead of it. Therefore there can be no other conclusion than that the moon repels water. The accepted interpretation, being quite otherwise, is completely impossible because water has a peculiar force, being diamagnetic (magnetic susceptibility $\alpha = 0.72 \times 10^{-6}$).¹⁷

Water is also forced to yield before a magnetic field. Hence the moon sets up a magnetic field which, in the interval of a day, produces a mean compression in the earth's magnetic field and forces the water in all directions. The moon thrusts water into a spherical bulge as it drives a large tidal wave before it and drags a depression behind it. If the earth were covered by water, these tidal bulges would form a huge belt which would define the sea level and would extend around the whole earth so that, because of the inertia of the seas, the moon would always be a little ahead of the midpoint.

The influence of the sun is similar to that of the moon. Since the sun's magnetic field envelopes the earth on all sides, its force is effective over the entire sphere of the earth. Hence its irregularities are not as evident as those of the moon.

According to the gravitational theory, the moon cannot push the sea but must attract it. In books we see illustrations of two tidal bulges which the moon is supposed to produce from the seas. The tidal bulge should be at right angles to the line of attraction between the earth and the moon and this is in direct contradiction to observation. Laplace

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¹⁷ Becker-Sauter, "Theory of Electricity," Stuttgart 1957.

set up a dynamical theory in place of Newton's theory whereby the moon would hold the moving tidal waves as a steady tidal bulge directly under the moon. Although the powerful daily force is considered as known with the utmost accuracy, it is evident that the knowledge of how this force acts on the water of the seas is far from correct. It is true that mathematicians have succeeded in finding a theoretical explanation for an earth completely covered by water or for a particular sea completely bounded by circles of latitude and longitude, but these difficult solutions have no meaning for the actual phenomena of the terrestrial seas because, under the present theoretical assumptions, the problem has no solution.

In recent times there has been some success (Hansen 1949) in establishing a network of empirical data along the coasts from the daily variations which are useful for making predictions. This method provides no scientific basis, however, since the tidal bulge actually takes place and leaves the human mind dissatisfied with its explanation as a phenomenon.¹⁸

The Atmospheric Tides

/20

Like all material bodies, the air possesses a real magnetic field. It is quite understandable that the orbital motion of the moon impresses a wave of one-half lunar day on the air masses. But now the moon operates by compressing the earth's magnetic field by a gradual push which has been determined from about forty years of observations at Batavia. The maxima occur at the lunar time of 0.8 hrs and 12.8 hrs, and shortly after each meridian passage of the moon. The largest amplitude occurs near the equator and the bulge is least near the poles.¹⁹

The atmospheric tides produced by the sun are appreciably smaller than those from the moon and are veiled under the much greater fluctuations due to temperature.

The gravitational theory offers an interpretation for the atmosphere: the sun and the moon are attracting it as matter. If this actually were the case, the curve for the air pressure fluctuations would be precisely determined by their motions because as the moon attracts the air, the weight with which the air presses on the earth's surface becomes less because the moon must "carry" some of this weight. Since this is not the case, the force producing the pressure waves in the air

¹⁸ A. Defant, "Ebb and Flow of the Seas, Atmosphere and Earth's Crust," Göttingen 1953.

¹⁹ A. Defant, "Ebb and Flow of the Seas, Atmosphere and Earth's Crust,"

clearly must be greater than any hypothetical attraction force from the moon or the sun.

The Daily Tides in the Earth's Crust

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The tides in the earth's crust have been measured by a horizontal pendulum (for horizontal motion) and by a gravimeter (for vertical motion). The apparatus for measuring vibrations in the ground on which they have to rest must be very sensitive. By actual measurement a horizontal pendulum swings in the direction of the moon just like a plumb-bob. In the same way a gravimeter shows a negative deflection for the upper and lower transits of the moon.²⁰

The existence of tides in the earth's crust has been clearly established. But how do they happen?

They are no different than the tides of the sea or of the atmosphere. The moon forces the mass of the earth from above and below with its magnetic field so that the ground directly under it must yield. This shift shows a corresponding reaction on the instruments as the moon lifts the weight of the apparatus.

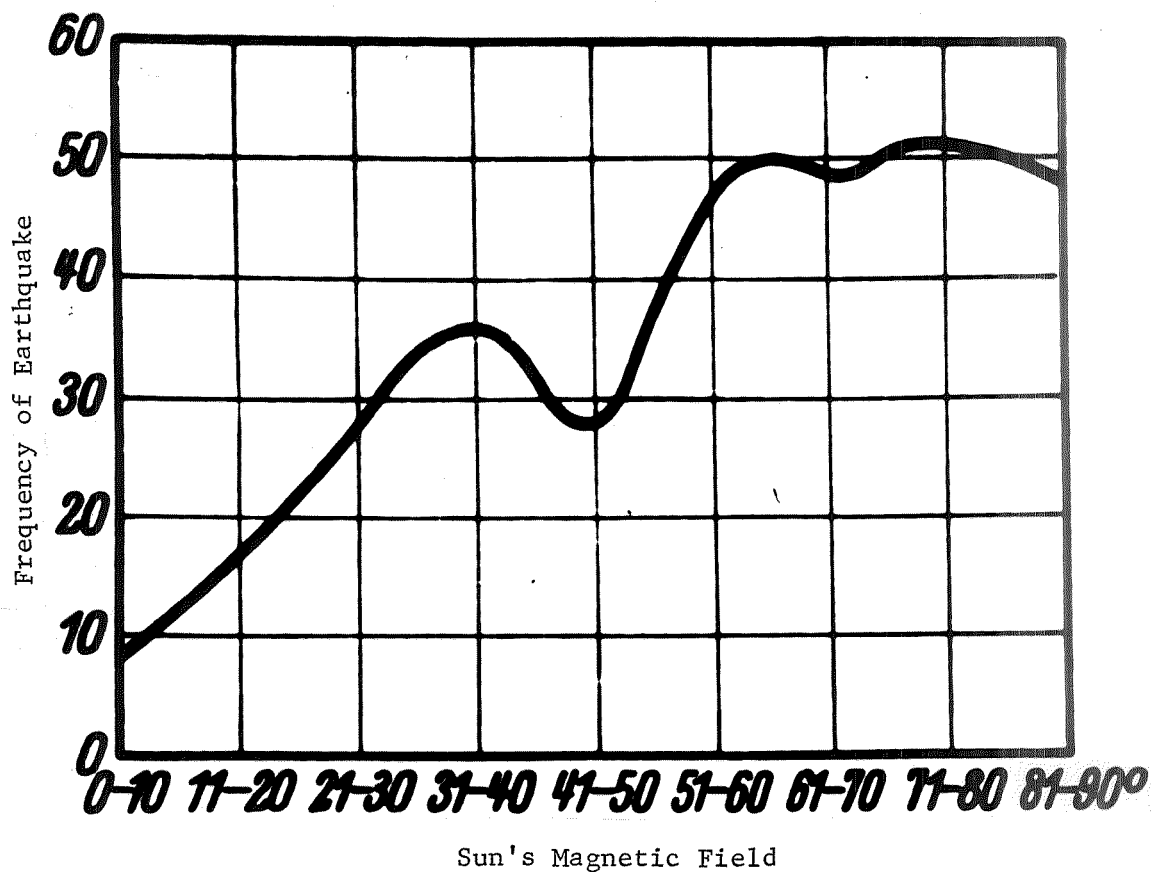
When we squeeze a soft ball with equal pressure on both sides, the greatest distortion takes place at right angles to the pressure as the surface bulges out between the two indentations. In exactly the same way, the earth's crust suffers its greatest expansion along the edge of the area where the moon is pushing the earth's core. Hence it is evident why there are frequent earthquakes when the moon is on the horizon. The sun acts in the same way. The combined force of both bodies at new and full moon causes a sharp increase in earthquakes. Figure 12.

The gravitational theory attributes, as usual, the tides in the earth's crust to attractive forces, by which the earth's crust must be dragged toward the moon or away from it. Consequently the appearance of earthquakes gives rise to a worthless theory that is contradicted by every event that happens and remains completely unintelligible with regard to the daily periodicity of earth tremors.²¹

The colossal amount of work expended on this problem avails nothing, so that in this respect the seismologists have come to the point where they should resign.

²⁰ A. Defant, "Ebb and Flow of the Seas, Atmosphere and Earth's Crust," Göttingen 1953.

²¹ V. Conrad, "Recent Conclusions on Earthquakes," Handbuch der Geophysik, Berlin 1932.



Frequency of Earthquake and Sun's Magnetic Field
by L. A. Cotton

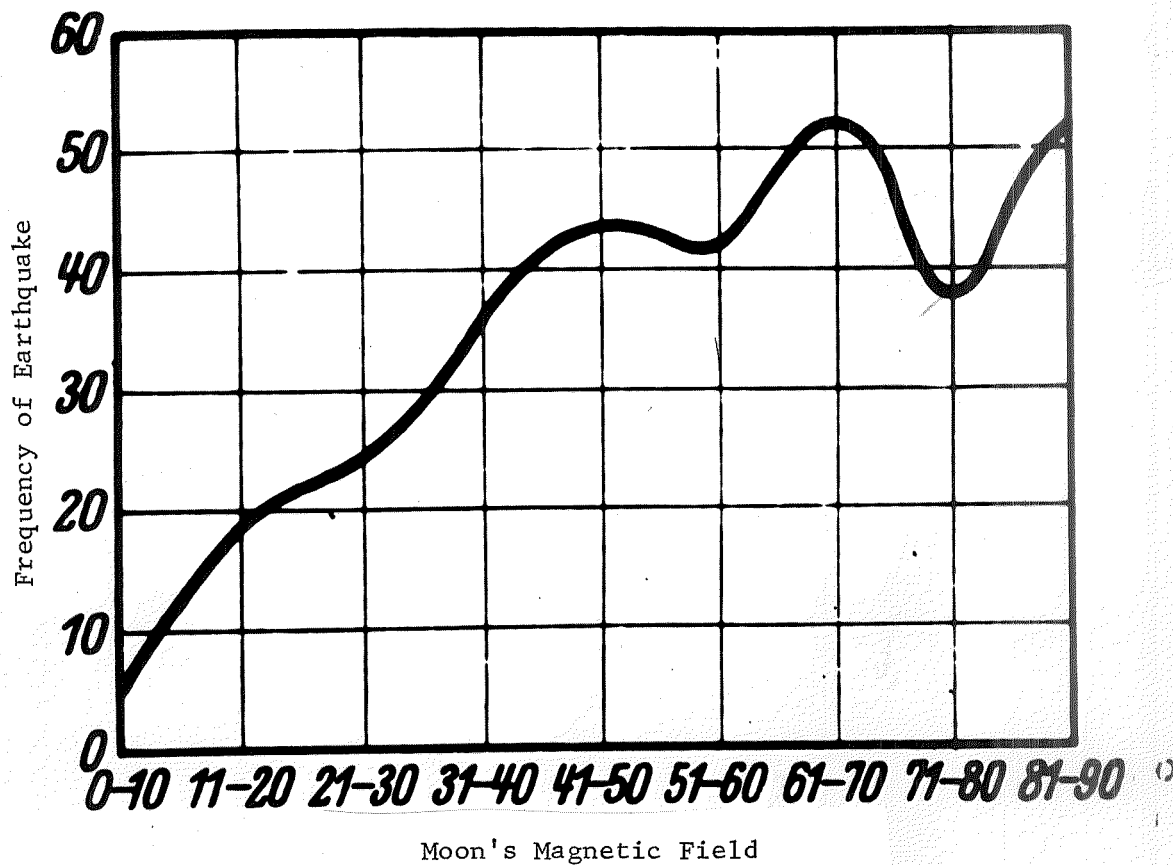


Figure 12. Frequency of Earthquake and Moon's Magnetic Field
by L. A. Cotton

The Annual Earth Tide

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In the experiment described under section 4 (the motion of a magnet with an inclined axis), we found the cause of the discovery by Kimura that the earth shifts in the direction of the sun's axis. The motion arising from the magnetic core of the earth induces a strain and a stress whence the crust, sea and atmosphere must lag behind this motion. While the magma moves up and down like the piston of a pump, the earth's crust is pushed up and down in such a way that inevitably a periodic earth tremor results. Let us compare the earth's crust to an arch, whence we can see that by an upward thrust a very strong break is induced in the earth's crust, while by a downward thrust only a slight bending occurs.

As the earth moves from the vernal point toward the south, an onset of strong quakes should be observed in the northern hemisphere during the summer months from May to August, whereas in the southern hemisphere during this same interval some slight earthquakes will take place. A half year later the effect is reversed. Figure 13.

In confirmation for these conclusions are the data for the northern hemisphere showing a maximum number of severe quakes in the summer and lighter ones in the winter. Six months later in the southern hemisphere, the same situation takes place.

The data for earthquakes taken over 2000 years, as observed in Japan, show a dependence between destructive earthquakes and shifting air masses. As the earth's crust heaves under the soft magma to the south, the air masses gather around the north pole where, since there is no build-up of air pressure, a depression takes place as the air is dragged along by the earth. Figure 14.

A similar effect happens with the water in the oceans which gathers at the north pole when the earth advances toward the south and arrives at its greatest position in October. On the other hand, the water collects at the south pole at the highest point in April. This dependence regarding the water mass at the poles was derived from the experiment but has also been exactly confirmed two years later by measurements made during the International Geophysical Year.

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The gravitational theory has nothing to say about such matters because the whole phenomenon, which appears as the Kimura-term for the variation of the pole, is derived only from observational errors.

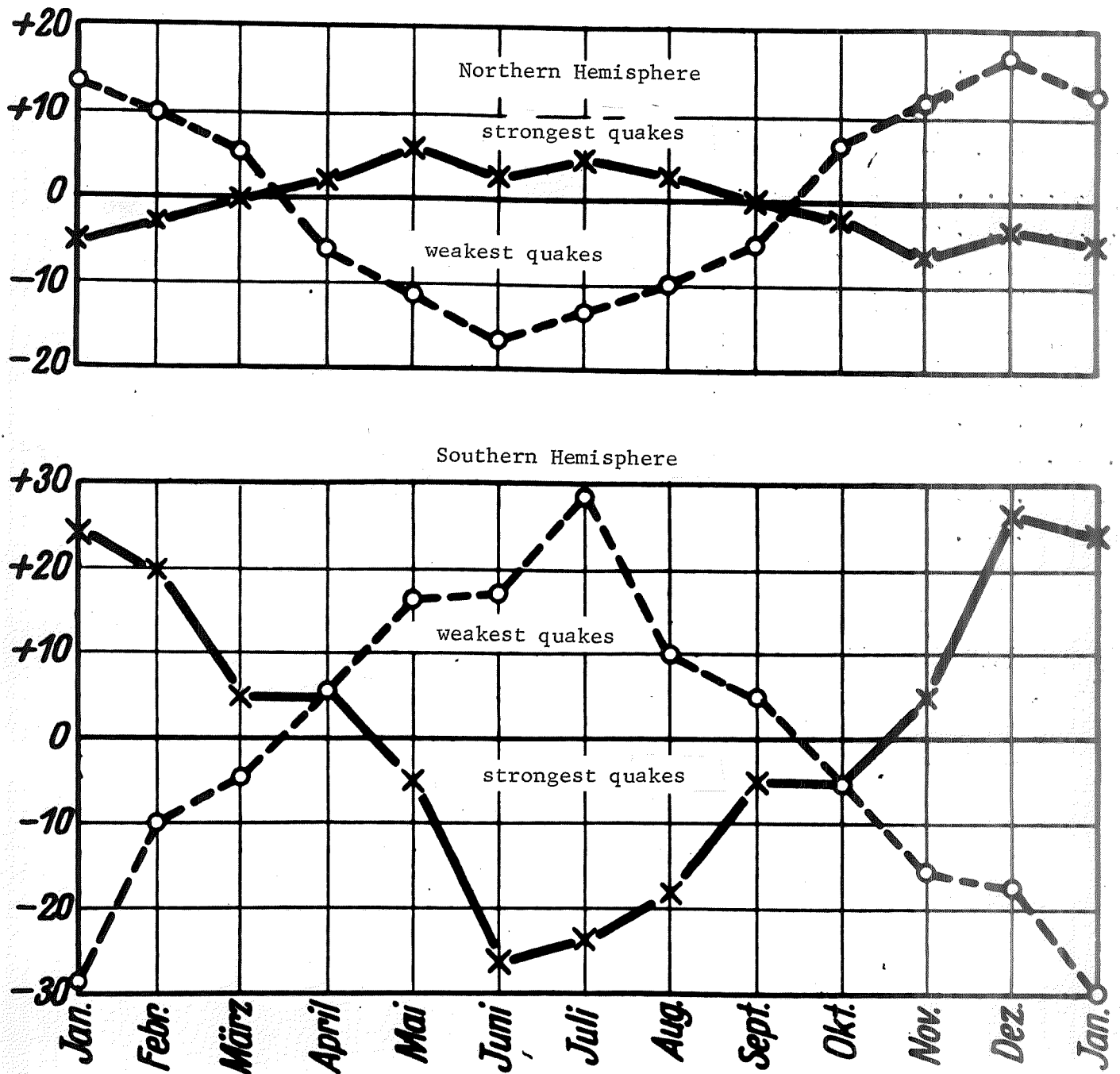


Figure 13. The Relation Between the Frequency of Strong and Weak Quakes in the Two Hemispheres According to Ch. Davison.
The Variations Are in Percentages for the Mean of Each Month.

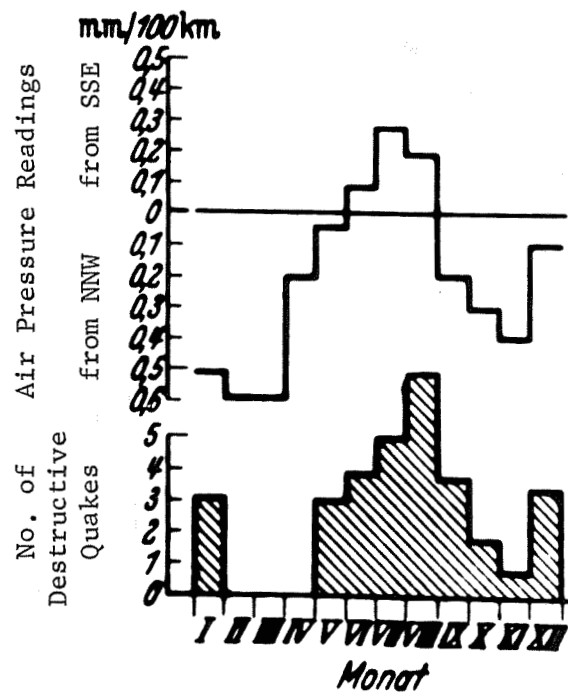


Figure 14. NNW - SSE - Components of Air Pressure Readings and Destructive Earthquakes in Kyoto (Japan) According to Mont
By A. Imamura

10. THE WAVE MOTION OF CELESTIAL BODIES

/24

The wave motions which have been observed in many star clusters have a very simple explanation if one considers a number of small balls, each of which is a little magnet with its axis parallel and placed deep under water. The balls repel one another and are forced to take new positions at fixed distances.

From the previous hypothesis that magnetic fields form in the cosmos from primeval nebulae, such bodies automatically repel one another and assume a unique array in which each remains bound to a uniform magnetic field.

One might think that the gravitational theory would make an end of such opposing arguments which are in diametric opposition to nature. But this does not happen. To make a transition from a theory of universal attraction between masses to a definition of opposite forces, one must do a somersault which the following excerpt describes:

"By gravitational influences the stars exchange energy among themselves; thus, now and then, a certain star attains an escape velocity and leaves the cluster.....In model I all stars which attain an escape velocity leave the cluster. They take with them the fraction, $P = 0.0052$, of the energy of the cluster which causes the radius of the cluster to shrink. The differential equation for the dissolution of clusters is integrable analytically. It states that the time of relaxation is linear with time and that every cluster according to the lifetime

$$T_H = 30 T_0$$

is nearly completely disintegrated."²²

Granted that there is no serious difficulty in these rigid mathematical presentations, we realize that we can hardly refrain from thinking of them as some intelligent waste of time, since we already know that the heavenly bodies push themselves away from one another because they repel each other.

Remarks

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In the battle over the Epicycles-theory, similar arguments were hurled against Copernicus and Kepler with whom the present gravitational theory is involved:

²² S. v Hoerner, "The Formation of Stars Through the Condensation of Diffuse Matter," Göttingen 1960.

"For many centuries observers had explained our theory in a satisfactory way. There is no reason why we should give up such a simple and empirically established theory because of a single paltry exception."

By closer inspection, it appears unquestionable that there is no single cosmical explanation from which the gravitational theory can be derived without the supplementary and arbitrary formulation of a hypothesis. In fact it is still obviously obscure on every point in cosmical mechanics which it undertakes.

Certainly no mathematician can see a solution in the computations with the force of gravity for the three-body problem, which is insoluble, because of the 18 integral equations, only 10 are known, while the other 8 must be dealt with by brute force in order to reach an approximation to the observed data. On this point, Strömberg, an old master at celestial mechanics, writes as follows:

"The orbital elements and the time appear so involved in these equations that every effort to attain an exact solution must fail. The problem is not soluble generally because the regular approach we take with the force function shows that a rigid solution is not permissible. But it can be said in every instance that the stability of the system of planets- as long as they keep their eccentricities and inclinations- is assured for as long a time as the influences from the secular forces of the first order will permit."

From this attitude we understand that the literature shows a fixed series of so called "anomalies" with which the celestial bodies are resisting the law of gravity. Let us gather together the great number of these anomalies in a typical example:

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The "latest and incontrovertible verification" of the gravitational theory was demonstrated in the discovery of the planet, Neptune, whose existence was predicted from the perturbations in the orbit of Uranus.²³ Such perturbations have been known to occur between magnetic bodies, so that this argument is hardly conclusive.

Likewise, on the strength of perturbations in the orbit of Uranus, the planet, Pluto, was discovered in 1930. The planet is some 500 million kilometers away, more than three times the distance of the earth from the sun, from its predicted position. By exact measurement it can be found that its mass is far too small and only one-tenth of what it needs to cause large changes in Uranus. The extraordinary mass

²³ K. Stumpf, "The Clockwork of the Heavens," Stuttgart 1952.

is very disconcerting because Pluto exerts no influence on Neptune, which is much nearer,²⁴ and the theoretical perturbing force in this case must be four times stronger than it is when the planet is in conjunction with Uranus.

What has been offered as a proof for the validity of the gravitational theory fits, with equal certainty, the explanations of phenomena that have been attributed to magnetic forces. According to the mutual orientation of their magnetic axes, magnets act with quite different effects. Thus might the large disturbances of Uranus indicate that its axis of rotation lies almost parallel to its orbital plane and forms a large angle with the axes of Neptune and Pluto, which causes a strong attraction. Since the axes of Neptune and Pluto have only a very narrow angle between them, their mutual influence is negligible.

In the foregoing discussion, the problems have not been dealt with comprehensively or presented fully. This task must await a later time. In the first phase, a quantitative approach to the magnetic forces between celestial bodies is necessary before getting involved in the difficulties of computation. /27

As for the structure and nature of magnetic fields, very little is known; nothing for sure of the rotation effect, the MAGNUS effect or the transverse motion in a homogeneous field can be surmised. So little can really be said of the relations in the cosmos. An entirely new foundation is needed on which to build the science of celestial mechanics. Every branch of science should make its contribution and not in the least to the space traveler when he sets out to visit strange worlds.

Wittlaer 7 July 1962

Johannes Leptien

²⁴ W. Strubell, "The Stars," No. 3/4, Leipzig 1952.